Gas Journal

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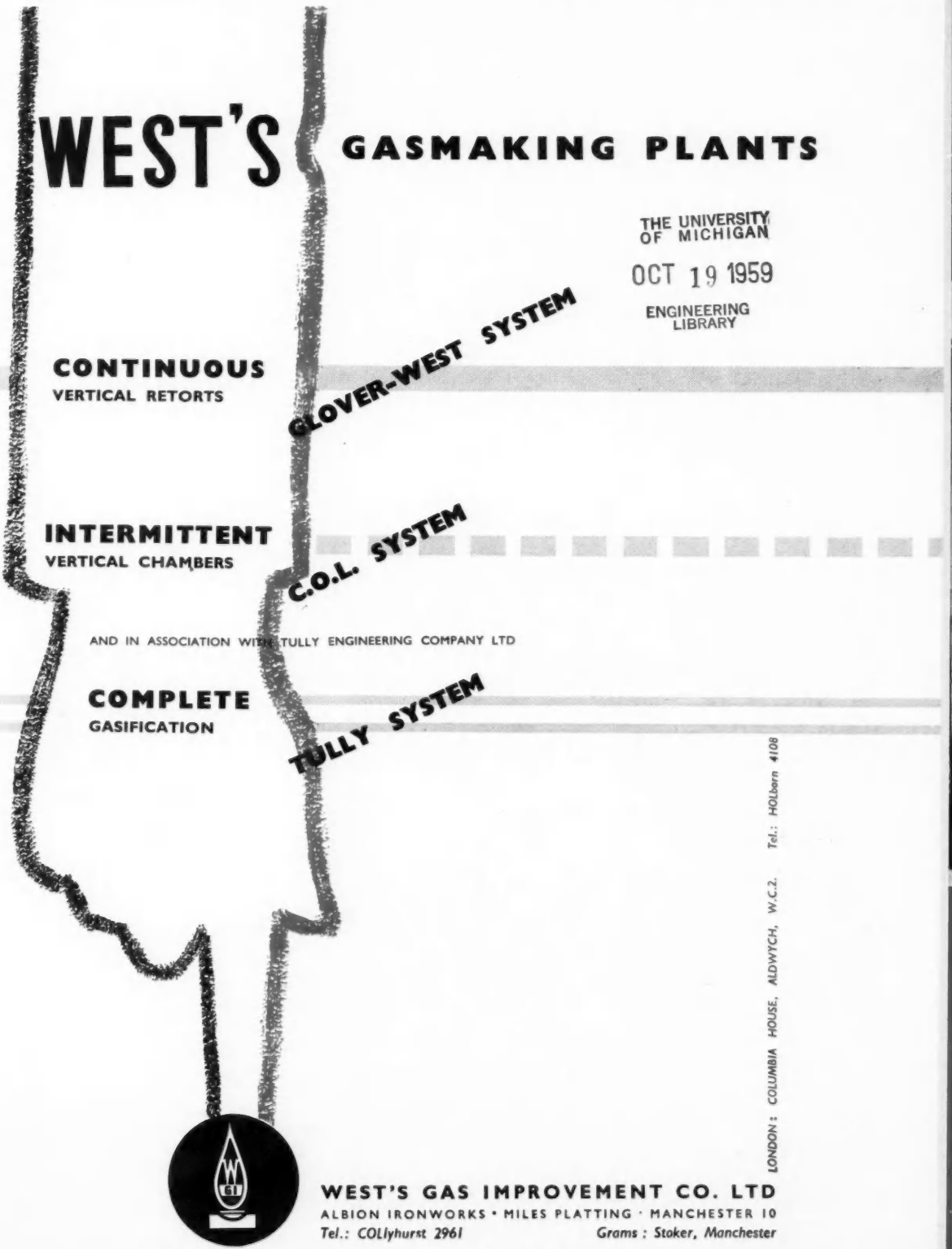

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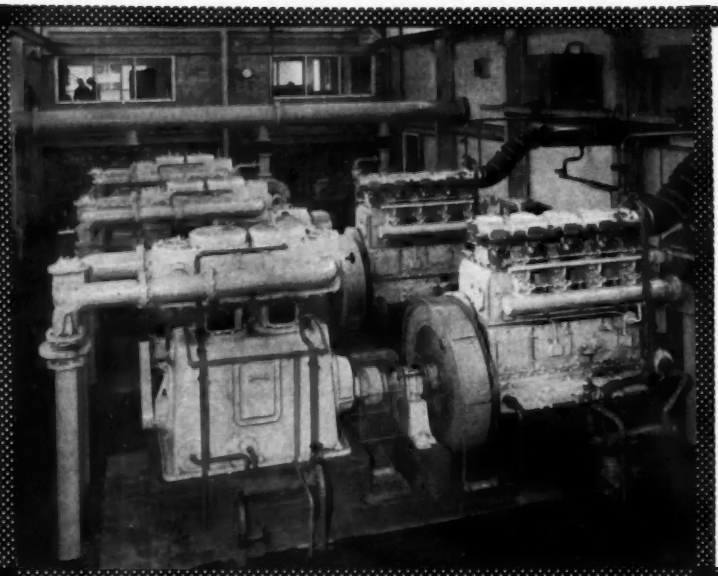

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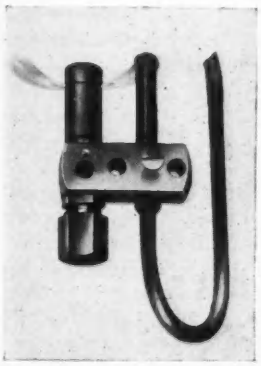

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Gas Journal

VOL. 299 *No. 5013* *[September 30, 1959*

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30, 1959

Gas Journal

VOLUME 299 No. 5013 SEPTEMBER 30, 1959 111th YEAR

Who Will Control Gas Production?

IN addition to our normal issue of the 'JOURNAL' we are publishing this week a 'Survey of Distribution,' which seeks to cover all aspects of the distribution of gas by the industry. Its contents range from a short history of the development of the gasholder to the relationship between the area boards and the mainlaying contractor, from welding to instrumentation, and from a reference of the West German grid of Ruhrgas A.G. and a possible comparison with our future needs to the conception of the Southern Board's 'backbone' main.

Such a survey, if it is to be of any value, must be thorough and as far as possible inclusive of all the many factors which go into the laying of a grid main and the supply of gas at high pressure over long distances; but we feel that in this case it is essentially an interim report.

The amount of work carried out in the last ten years in the development of gas supplies compared with anything done previously is quite phenomenal. As soon as the area boards had been formed and vesting day a matter of history, distribution engineers began to turn their attention to finding means of improving gas supply generally, and as production departments came to realise how poor the state of maintenance was of many of the medium and smaller works, to consider how additional supplies could be brought in to avoid replacement of obsolete gasmaking plant by the establishment of holder stations. The area boards have been remarkably successful and a great many hopelessly uneconomic works have disappeared, resulting in an improvement in load factor at the larger and clearly more efficient central sources of supply.

Why could this not have been done earlier? The answer is well known and the failure of the industry to develop may also be fairly attributed to the system of statutory areas of supply which were inviolable without the amalgamation of the interests of both parties, though legislation in the late 1920's did make holding companies possible. Unfortunately economic conditions of the day did not favour the laying of long distance pipe-lines in the place of the smaller production plants. The nearest project to come to anything approaching a modern grid system was the United Kingdom Gas Corporation's Yorkshire grid for collecting coke oven gas and distributing it to gas consumers. Even so, it was forbidden to go into Leeds and had to go round it.

The creation of the area boards and the repealing of former legislation did away with such limitations and made possible increased areas of development, the boards being charged at the same time with the duty of giving a supply of gas at a minimum pressure to all its consumers. In country districts this duty generally made it necessary to lay a grid supply and close down the local production station. The board could never make the excuse that it was not economic to do so. In fact, in many cases, the small town or village, when connected to the grid system, received such an improved supply that consumption rose by as much as 100% or more.

What stage have the area boards now reached and what does the future hold out for further grid developments? There have been a number of papers published on the development of the supply systems in individual board areas, and it is immediately apparent what a very thorough job has been made. Each grid-main layout appears to have its own very individualistic design and we think that an unprejudiced person might be forgiven if he went away with the impression that in spite of nationalisation and the integration of so many separate undertakings, the old statutory area design was being repeated, but now in 12 areas instead of many hundreds. In other words, has any thought been given to the integration of all the area boards' grid systems into a vast comprehensive supply system whereby gas made anywhere on the mainland could be consumed anywhere or everywhere else in the British Isles? We think this is highly doubtful, though it does not necessarily mean that existing supply systems or those about to be built have been wrongly planned and are too rigid to form a comprehensive part of a national grid. It is noticeable, however, that no provision has been made to pass gas from one board to its neighbour on a really large scale. Connections do indeed exist, but would seem to be there by accident rather than design.

At present the conception of a national grid appears to depend on little more than hearsay or at best on a

well-founded rumour. Sir Harold Smith has made passing reference to it on several occasions and Sir Henry Jones mentions it in his William Young Memorial Lecture, so the idea at least has official backing and recognition. Does its reality depend on the success of the new gas-making processes that are now being worked out or does it depend on a decision to change the whole administrative set-up of the Gas Council in relation to production?

We feel that if the new processes are a technical and financial success and gas production from them is to be confined to collieries, oil refineries or the ports, some area boards may well find production uneconomic within their own areas and will want to buy from the cheaper source. To enable them to do this, a national supply grid would have to be in existence, but in whose hands and under whose control would production on a nation-wide scale be? Who would be responsible for bulk gas transmission to the existing grid systems if the area boards are still to remain autonomous?

Undoubtedly a central control body appointed by the Gas Council would have to be set up which would take gas production out of the hands of area boards. There would in fact be a central production authority similar to the central generating authority of the electricity industry. A national grid could then be superimposed upon the present area grid systems to supply area boards at points where the present gasworks are situated. The management and control of this bulk supply would be centred somewhere in the Midlands and gas made in the various coalfields would be despatched as needed.

We feel that the autonomy of the area boards is of such great importance that it is only in this one respect that it would be safe to interfere with it. In the last ten years the gas industry, in spite of the badly maintained and obsolete plant and the poor condition of many of the local distribution systems it took over on vesting day, has been able to put its house in order, and we think it is fair to say that this is largely because day-to-day control was not from Murdoch House. Decentralisation has been the keyword of this particular industry and the envy of some of the other nationalised industries. By all means let local administration, sales and service, local gas distribution and local financial organisation remain in the able hands of the board chairmen, but we are convinced that if full advantage is to be taken of the possibility of really cheap gas, production must be in the hands of a 'supra-board' body under the control of the Gas Council. Supplies would still be under the ægis of our own industry and certainly no more subject to the whim of the economic conditions of some other industry than they are today. Indeed, from the point of view of seeking Ministerial sanction for new projects and negotiating with other industries, such as the oil and coke oven industries, a national body would enjoy obvious advantages.

Abraham Darby—Experimenter Extraordinary

AN event of great interest to modern industry was celebrated recently by the coking and metallurgical industries for it was in 1709 that experiments for the smelting of iron by coke was successfully carried out by Abraham Darby I at his furnace at Coalbrookdale in Shropshire. Hitherto ore had been smelted by the use of charcoal or wood, and although the quality of the iron may have been excellent, the supply of wood was becoming restricted. Apart from the alarming rate at which forests would have to be felled if the iron industry was to expand, there was keen competition from the demands for shipbuilding, especially the navy.

In industry generally coal—probably called 'sea-coal' in those days—was being successfully used in place of wood or charcoal, but all attempts to use it for iron smelting had proved unsatisfactory. Iron was used both in the form of cast iron and wrought iron and if coal was used in both its smelting and conversion to the malleable form, the product was brittle and failed under the hammer when forged, and was therefore unworkable.

The modern expression 'break through' applied to an important advance achieved in scientific and industrial research is well known and generally heralds an announcement that the main difficulties for further development in some process important to the nation and the world are about to be solved. Such 'breaks through' are nothing new but before the days of organised publicity their recording was a much more private affair and was little more than an entry in a diary.

What was the real significance of Darby's work? Was it merely an experiment in the use of a new process, or did it have more significance even at that time? The use of coke seems so fundamental to the iron and steel industries that its importance appears obvious to us. Darby was not the first to try and find a substitute for charcoal; others before him had used coke, possibly with success. But Darby seems to have been the first to make an organised attempt, since he had set about collecting his materials the year before and had collected a stock of ore and coke well in advance. It would seem therefore, that he was determined to give the new process an extended trial.

This was by no means his first appearance as a metallurgist. He had started a brass foundry in Bristol some years before and had made such a success of it that he has been hailed as the founder of that particular industry in this country. The iron that he produced by coke smelting was found to have superior flowing properties and was capable of being more easily run into moulds to form thinner walled castings which could be made in conjunction with his Bristol foundry.

Darby died when he was 39 but fortunately for posterity his family continued his work and perfected the techniques, so that the British iron industry, which had already started to decline, was ready for the great demands to be made upon it when the discovery of the steam engine accelerated the Industrial Revolution in the last half of the century.

Today, with science and technology as the hand maidens of industry, it is difficult for us to realise that the only way to solve the problems facing the early industrialists was by enterprising men carrying out experiments, often inspired, sometimes painful, generally by rule of thumb, on the full industrial scale of the day and occasionally having a 'break through'.

Personal

MR. R. M. MUNNS is to be an Assistant Commercial Manager, attached to the Commercial Manager's Office at Croydon, as a result of substantial changes in the organisation of the Commercial Department of the South Eastern Gas Board, to be made over the next two or three years. The changes will result ultimately in the establishment of thirteen districts in London in place of the present four divisions and the concentration at central points of some of the clerical work formerly carried out at district and divisional offices. The headquarters organisation at Croydon will be strengthened to support the new districts in carrying out their primary task of selling and giving service to customers. The initial changes will take place in the present East Surrey Division with the formation of two new districts—Croydon and Reigate. Other staff changes are as follows:—

MR. G. E. FOREMAN to be Manager, Croydon District.

MR. H. J. TAYLOR to be Manager, Reigate District. These changes become effective on October 1.

MR. A. D. TURNER has been appointed Managing Director of the Crittall-Aquafont Group Ltd. He has a background of experience in the manufacture of domestic appliances and has served with companies in the Radiation and Parnall Groups, in addition to many years with the Brush Group, where he was concerned with large quantity production of high precision engineering products. The Crittall-Aquafont Group combines the activities of Crittall-Froy Ltd., which manufactures Crittall kitchen equipment, and Aquafont Equipment Ltd., which makes the Aquafont light duty catering equipment.

DR. T. W. T. BAILLIE has been appointed Production Manager of the carbide and acetylene factory at Carbide Industries Ltd. at Maydown, near Londonderry. Other appointments include MR. W. W. RINGLAND, Chief Works Engineer, Mr. A. R. ROBERTSON, Commercial Manager, and DR. R. D. THROWER, Works Research and Development Manager. The company is a member of the British Oxygen Group.

MR. W. BOLTON, who recently retired as manager of the St. Neots (Hunts) district of the Eastern Gas Board after 52 years in the gas industry, was, at a farewell gathering at St. Neots, presented with a tea service. The formal presentation was made by the Divisional General Manager, Mr. J. Hunter-Rioch. Altogether Mr. Bolton was 24 years at St. Neots.

MR. G. J. LYONS has been appointed Secretary of the Institution of Plant Engineers in succession to MR. R. F. FARMER, who has resigned to take up an appointment with the Institute of Civil Engineers.

Obituary

DAME VERA LAUGHTON MATHEWS

DAME VERA LAUGHTON MATHEWS, adviser on women's affairs to the Gas Council and member of the South Eastern Gas Board since vesting date, died at her London home on Friday, her 71st birthday. In 1947, after serving 7½ years as director of the W.R.N.S., Dame Vera was invited by the Minister of Fuel and Power to become chairman of the Domestic Coal Consumers' Council, set up when the coal industry became nationalised. She also served on the Fuel Efficiency Committee of the Ministry. On her appointment as member of the South Eastern Gas Board, she became the first woman in British gas management. It was in 1950 that she became adviser on women's affairs to the Gas Council. In 1949 Dame Vera became president of the National Smoke Abatement Society, a position she held for two years. In addition to being vice-president of the Women's Gas Federation she was an associate of the Institute of Fuel, and an associate member of the Institution of Gas Engineers. She was created D.B.E. in 1945. A widow, Dame Vera had married in 1924; there are three children and two grandchildren.

MR. BERNARD BROWNE

MR. BERNARD F. BROWNE, O.B.E., has died in his seventy-ninth year. He had been a member of the Institution of Gas Engineers for 53 years. Trained by the South Metropolitan Gas Company, he went to Buenos Ayres in 1902, and two years later became general manager, Primitiva Gas Company, where he remained for some years. In 1911 he became general manager of the City of Santos Improvements Company; in addition to gas supply this company operated light and power, water and tramway services. He became consultant to Primitiva Gas Company in 1924 to reorganise that company's business. On the inclusion of the City of Santos Company in the Brazilian Traction Group, he added technical supervision of gas companies in Rio de Janeiro and Sao Paulo, in 1929, to his existing duties. He retired from active service in Brazil in 1936 and became consultant on gas affairs to the company in London. Then he joined the United Kingdom Trading Corporation and spent some years in Lisbon. He returned to England towards the end of the war for health reasons and gave voluntary service to the Ministry of Fuel and Power in connection with fuel rationing in Yorkshire. On the conclusion of hostilities he visited Athens to advise regarding getting public utilities of that city in working order as quickly as possible. Until shortly before his death, he rendered valuable service to the North Eastern Gas Board. Before local Health Laws were in operation, Bernard Browne instituted in his company clinical and health services for the employees and became closely integrated in the work of the local hospitals, so that today his photograph and bust are to be found in their halls and board rooms, notably in the Portuguese hospital known as Beneficencia Portuguesa. In his humanitarian work in Santos he was ably assisted by his wife, who was also a leading spirit in the Missions to Seamen in Santos. In Santos he actively co-operated in civic affairs and took a leading part in salvage work when a large landslide occurred in the centre of the city in 1924, burying rows of houses and demolishing a section of the Santa Casa Hospital, which had over 1,000 beds. For this and other such activities he was made a Citizen, a rare honour for a foreigner. He was a founder member of the Rotary Club in Santos, and an enthusiastic Freemason both in Brazil and England. He was a P.M. of the Evening Star Lodge and a Founder of the Chapter. He leaves a widow, son and four daughters.

MR. W. BEVERIDGE FARQUHAR, who retired from the position of manager at Ilford in 1924, died recently aged 83. Mr. Farquhar, who received his earlier experience at St. Andrews, Leith and Huddersfield, was a founder member of the Southern Association of Gas Engineers and Managers.

MR. SAMUEL CLIFFORD MARKHAM, who since 1935 has been manager of Bottesford, Notts, gasworks, has died.

Colonel W. R. Glover

A memorial service for the late COLONEL W. R. GLOVER, C.M.G., D.S.O., T.D., was held on September 25 at St. Sepulchre's Church, Holborn Viaduct, London. The Rev. P. R. Wansey, Honorary Chaplain to the Royal Fusiliers, officiated, assisted by the Rev. A. W. G. Cope, Chaplain to the Haberdashers' Company.

Those who attended included Sir Harold Smith and Sir Henry Jones, Chairman and Deputy Chairman respectively of the Gas Council; Chairmen and representatives of the various Gas Boards; Mr. C. G. Gardner, First Warden of the Haberdashers' Company, representing the Master; Lieutenant-Colonel E. W. Lloyd, of the Past Officers' Association, Royal Fusiliers, and many other friends and acquaintances made throughout a lifetime of service.

Mr. Diamond tells Consultative Council sad saga of Coleshill Lurgi plant

REASONS for the excessive delay in introducing a new £6.5 mill. Lurgi gasification scheme at Coleshill, were given by Mr. G. le B. Diamond, Chairman, at a meeting of the West Midlands Gas Consultative Council last week.

Mr. Diamond said it had been decided to introduce the new plant after it had become clear after nationalisation that an increase in gas making of about 24 mill. cu. ft. a day would be needed in the near future.

At first it was decided to put the plant on the Mond site at Tipton. This plan was announced in 1952, but had to be abandoned because of difficulties in finding an outlet for the effluent.

After an abortive attempt to site the plant near the Willenhall gasworks, 26 sites in different parts of the West Midlands were inspected in 1953 and 1954.

Seven of these were closely examined but none was found to fulfil the necessary requirements.

Attention was finally directed to a site at Gorsey Lane, Forge Mills, Coleshill, but in December, 1955, the Warwickshire County Council refused planning permission and the Board appealed to the Minister of Housing and Local Government.

Mr. Diamond then outlined the protracted legal proceedings which delayed a public enquiry into the matter until October, 1957.

Green belt violation

Subsequently it was found that the Minister would find himself in difficulty in giving a decision which might violate a part of the green belt, and the Board was asked to look at another site at Hams Hall.

Planning permission was again refused and a further appeal was made by the Board to the Ministry.

The Ministers concerned decided in December, 1958, to allow the Board's first appeal for the erection of the new plant at Gorsey Lane, Coleshill.

The Minister had now given his approval in principle to the scheme, but there were qualifying conditions, and one of these related to the economics of the proposal.

Firm quotations for every item of the plant had to be obtained before an order could be placed—a task which was proceeding with all speed, but which was likely to take several months to complete.

TEES-SIDE CLEAN AIR CAMPAIGN

THE Tees-side clean air campaign, the second in the area in recent years, is being held under the auspices of the Tees-side Smoke Abatement Committee and co-ordinated by the Solid Smokeless Fuels Federation. It will run for three months, commencing with an exhibition at All Saints church hall, Middlesbrough, on October 5. Exhibitions and meetings will be held subsequently in the principal centres on Tees-side.

The principal exhibitors will be the Northern Gas Board, Solid Smokeless Fuels Federation, the North-Eastern Electricity Board, the Coal Utilisation Council and the Department of Scientific and Industrial Research. Mobile exhibitions, organised by the various participating bodies, will also tour Tees-side during the period of the campaign.

W.G.F. CONFERENCE

Miss Pat Hornsby-Smith, M.P., Parliamentary Under-Secretary of State at the Home Office, and Mr. D. G. Stratton, a member of Sir Vivian Fuch's trans-Antarctic Expedition, will be the principal speakers at the Women's Gas Federation 15th branch conference, to be held in London next month.

Sc.G.B. WORKERS STRIKE OVER MAN'S DISMISSAL

OVER 40 Scottish Gas Board workers at Kirkcaldy staged a one-day strike recently after a young employee had received notice of dismissal. Fitting and distribution work was affected, but not production.

Twenty-one years old Mr. Douglas Fernie was given notice after having failed his City and Guilds examination three times.

Mr. Ronald E. Sills, the Kirkcaldy Group Service and Sales Manager, stated: 'An employee has been given notice in accordance with an agreement which was made through the N.J.I.C. in May, 1953, and put into operation in September of the same year. I understand this is a one-day strike in protest against the national agreement. It is being carried out despite the fact that further discussions have been arranged with the district organiser of the National Union of General and Municipal Workers.'

Mr. T. Downie, local part-time Secretary of the Union, said: 'The lad is over 20 and due for military service. He is now faced with the prospect of returning from the forces to start work as a labourer after wasting vital years serving an apprenticeship.'

Mr. Fernie said: 'Some apprentices have had four attempts to pass the City and Guilds intermediate examination. I passed the practical side and failed on theory.' He added that after receiving notice he asked for a job as a maintenance fitter but had been told that there were no vacancies.

OIL EXPLORATION IN INDIA

PROF. M. S. THACKER, Secretary of the Union Ministry of Scientific and Cultural Affairs of India, stated in Calcutta on September 12, when delivering the Sir Thomas Henry Holland Memorial lecture on mineral exploration and development, that exploration on a large scale for oil was being actively pursued by the oil and natural gas commission of the Indian Government. The sedimentary basins that fringe the Gondwana massif of crystalline and sedimentary rocks covering about 400,000 sq. miles were potential oilbearing areas, and portions of the basins in Cambay, Rajasthan, Punjab, the Gangetic valley and Upper Assam were also being explored systematically.

Power-Gas trading activities changes

FROM October 1, 1959, the trading activities of the Power-Gas Corporation Ltd. will be taken over by two wholly-owned subsidiaries of the same address.

Ashmore, Benson, Pease & Co., Ltd., will control the Corporation's Stockton works, manufacturing and selling all types of heavy engineering products, and specialising in the design and supply of plant and equipment for the iron and steel industry.

P.G. Engineering Ltd. will undertake the design and supply of plant and equipment to the chemical, gas and petroleum industries, and also engineering contracts of a general character.

Contracts taken by the parent company prior to October 1, 1959, will, after that date, be completed by the appropriate subsidiary on behalf of the parent company.

N.W.G.B. TEAM WINS FOR THIRD TIME

FOR the third time out of a possible four, a team from the North Western Gas Board won the gas industry's Women's National First Aid Competition, held in London recently.

The team competed with eight others from the area boards in Britain.

The winning team came from Northwich and was led by Miss N. Hooley, a clerk in the fittings department of the Mid-Cheshire Group's Accounts Section. Her team consisted of Mrs. N. M. Eyes, Miss W. Littler, Miss E. M. Hearn and Miss R. Davenport (reserve).

New methane pipe-line

Some 741,300 mill. cu.ft. of methane—equivalent to 24 mill. tons of coal—will be piped annually to industrial consumers in the Urals from the Gazliisk deposits in Uzbekistan. A 1,240-mile pipe-line will be built to carry the gas.

Lost discount mourned by North Eastern G.C.G.

KEEN disappointment at the decision of the North Eastern Gas Board to withdraw the 2½% discount on promptly paid bills was expressed at the North Eastern Gas Consultative Council meeting in Leeds on September 21 when Mr. W. H. Laycock, on behalf of the Huddersfield-Halifax local committee, moved a resolution asking the Board to reconsider their decision, particularly as the majority of consumers pay before the due date, thus saving postage for reminders and interest on monies borrowed.

'Our committee are nearer to the public than the Board are,' said Mr. Laycock, 'and we very much doubt the wisdom of the decision which we regard as a very serious, retrograde step.'

Asked what was the percentage of the consumers who paid before the due date, Mr. Laycock said it was about 80%.

Several other members carried the discussion further and all were interested in, and sympathetic to, the Huddersfield-Halifax resolution.

'Come into line'

Alderman H. Sutcliffe, Chairman of the council, said the Board had gone pretty thoroughly into this matter and felt that it was time to come into line with boards in other parts of the country who did not allow a prompt payment discount. The discount clause, he said, cost the Board about £180,000 a year, and he was given to understand that if the Board reinstated this discount policy it would affect the price of gas.

Alderman Sutcliffe asked Mr. Laycock if his committee would like a 1½d. increase in the price of gas instead of 1d. increase. Mr. Laycock said, 'Yes, I think we should prefer an honest, straight-forward increase rather than this camouflaged increase.'

When the resolution was put to the meeting it was defeated, but it was decided to review the matter at a later date.

H. & G. CONTRACT

A NEW export contract has just been awarded to Humphreys & Glasgow Ltd. for the supply, erection and commissioning of gas-making plant at Bhopal, India. Work is about to begin on the contract and will be completed early in 1961.

This contract was awarded through Associated Electrical Industries, Ltd., acting as purchasing agents for Heavy Electricals, Ltd., an organization which is constructing a factory for the manufacture of heavy electrical machinery at Bhopal, a Government of India undertaking.

The contract is for a complete small gasworks to supply blue water gas for use throughout the factory. The gas will be used mainly for heat treatment processes, but some will also be available for domestic purposes. The volume of gas produced will be about 1,500,000 cu.ft. per day.

W.M.G.B. secures £50,000 Halcyon heaters order

A £50,000 order for Halcyon heaters has been secured by the West Bromwich district of the West Midlands Gas Board.

The appliances are being installed in 750 houses on two new estates which W. J. Cale of Birmingham are developing at Park Farm Estate, Aldridge and Greenfields Estate, West Bromwich. In addition, it is likely that 750 Gascold refrigerators will be fixed in the premises.

Behind this success story lies a lot of hard work put in by the West Bromwich District New Building Section, especially by the representative, Mr. K. C. Stark, and the Sales and Service Superintendent, Mr. P. Mackenzie, in conjunction with William Sugg & Co. Ltd., makers of the Halcyon air heating unit.

The New Buildings Section gets advance information on proposed building developments and is then able to discuss with architects at the planning stage, the advantages of providing the necessary points for gas appliances. In turn, the gas staff are often consulted on technical matters and supply expert advice.

A spokesman of the West Midlands Gas Board said: 'The order shows the opportunities that exist for expanding our space heating load at present when big housing developments are taking place throughout the area and when the public is becoming more interested in whole house heating.'

A show house has been fitted with a gas cooker, wash boiler, poker, Gascold refrigerator and the Halcyon unit and will remain open to the public for 12 months.

Diary

October 1.—NORTH OF ENGLAND SECTION, I.G.E.: Visit to coal mine.

October 1.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: Porthcawl. Annnal General Meeting followed by official luncheon and a visit to the Abbey Works of the Steel Company of Wales.

October 2. — SCOTTISH WESTERN JUNIORS: 9, George Square Glasgow. Address by E. G. Smith, Deputy General Manager of Glasgow and Western Division. 6.30 p.m.

October 2.—WALES G.C.C.: Civic Centre, Tenby. Meeting at 11 a.m.

October 7.—COMBUSTION ENGINEERING ASSOCIATION, SCOTTISH REGION: The Grand Hotel, Glasgow. Brains Trust on 'Clean Air and Industry' and a discussion on 'Instrumentation and Smoke Control.' 10 a.m.

October 7.—SOCIETY FOR ANALYTICAL CHEMISTRY: Burlington House, Piccadilly. Meeting on 'Atmospheric Pollution Analysis.' 7 p.m.

October 9.—EASTERN SECTION, I.G.E. Visit to Borg-Warner Ltd., Letchworth.

October 9.—LONDON AND SOUTHERN JUNIORS. Presidential Address.

October 10.—EAST OF SCOTLAND JUNIORS: Gas Showrooms, Dundee. Presidential Address of Mr. J. T. Christie.

Australian licensees for Whessoe

NORMAN J. HURLL & CO. (VICTORIA) PTY. LTD., of Melbourne C.1, Australia, and Christchurch C.1, New Zealand, are, by the terms of a recent agreement with Whessoe Ltd., now able to offer the complete range of Whessoe gas plant in Australia and New Zealand apart from W.W-D. electrodetarrers which Woodall Duckham (Australasia) Pty. Ltd. will continue to supply.

The company will act as licensees, arrange Australian manufacture and carry out contracts for plant to Whessoe designs and guarantees. In their capacity as gas plant contractors in New Zealand as well as Australia, Hurll will act as Whessoe agents and provide process plant and ancillary plant.

Arrangements between Hurll and Whessoe are such that full technical and commercial collaboration between these well-known firms of gas plant contractors will assure customers in Australia and New Zealand of the availability of the latest Whessoe designs of plant for gas treatment and storage.

BUILDING CENTRE FOR MANCHESTER

THE Manchester Building Centre Ltd., has been formed with the support of the Building Centre, London, to whom it is affiliated. Its objects are similar to those of the London Centre and can be summarised as providing facilities for manufacturers to exhibit products used in the construction and equipment of buildings so that architects, surveyors, engineers, builders and members of the general public can see in one place a representative and up-to-date selection. There will be an unbiased information service and space for lectures and visiting exhibitions.

Correspondence is being dealt with by the Director, Mr. John P. Griffiths, at the temporary office in the Department of Building, The College of Science and Technology, Sackville Street, Manchester, 1.

Scottish Association Golf . . .

THE Challenge Bowl and Replica was won by Mr. A. R. Barrack with an aggregate of 70 at the Autumn Competition of the Scottish Association of Gas Managers' Golf Circle at its autumn meeting at Largs. In Section 1 first prize was awarded to Mr. C. T. Baker-Carr, who also won the Winson Scott Cup Veterans Trophy, with an aggregate of 72. The runner-up was Mr. S. K. Patterson (74), and Mr. J. Morrison and Mr. J. M. Dow tied for third prize. In Section 2 Mr. C. Keith was awarded first prize with 76 and Mr. J. M. Hendry second prize with 78.

In the Visitors' Competition, first prize was won by Mr. C. R. Averill with 73, the second prize by Mr. S. Meunier (74), while third prize was shared by Mr. S. Smith, Mr. N. Sutcliff and Mr. K. Hollingsworth, who tied with 81.

Mr. J. M. Down, of Edinburgh, with two down, won the Spring Bogey Competition, while Mr. D. J. Colvin, of Edinburgh, and Mr. T. Robertson, of North Berwick, who tied three down, were the runners-up.

Right: *To mark the club's appreciation as secretary for 25 years, Tommy Thomson was presented with a coffee percolator and Mrs. Thomson a standard lamp by John Ford.*

Above: *The winners in the S.A.G.M. Golf Circle competition line up with members. From the left—D. D. Melvin; Sydney Smith; A. R. Barrack (Fraserburgh); Mrs. E. G. Smith, who made the presentations; C. T. Baker-Carr; E. G. Smith; John M. Adams (Thos. Glover); W. Rae and David Fulton.*

. . . and Bowls

Left: *The winning rink in the bowls game are on the right of the photograph—they are—J. Muir (Rothesay); R. S. Murray (Glasgow), John Wood (Largs) and William Strachan (Largs). Also in the picture from the left are C. J. Gregg, secretary of the bowls club; A. McFadyen; Mrs. McFadyen, who made the presentations; and T. Thomson.*

LOOKING TOWARDS 2000 A.D.

By SIR HENRY JONES, M.B.E.
DEPUTY CHAIRMAN, THE GAS COUNCIL.

The William Young Memorial Lecture, 1959, to the Scottish Association of Gas Managers' A.G.M.

WILLIAM YOUNG was born in 1841 at Selkirk, the eldest son of Mr. John Young, then Manager of the Selkirk gasworks.

In 1854 John Young with his family moved to Dalkeith, and a Mr. Bell, to whom the lad William was apprenticed as a plumber, found him to have a restlessly inquiring and inventive spirit. At the age of 22 William became Manager of the Lasswade gasworks. The works was a small one, but it presented its opportunities, for close at hand there was a large bing or heap of waste shale. His attention turned to shale and its problems, and he was soon managing shale oil distillation not only at the gasworks but also at the pit.

He later became Manager of Straiton oil works and the outcome of experiments there was the distillation of shale at two temperatures, with recovery of nitrogen as ammonia. In 1885 at the age of 44 he was able to retire from active managership and became a consulting chemical engineer, living at a quiet little cottage on the banks of the Tweed at Peebles. Despite ill health he continued experiments in the service of the shale and gas industries.

He was a very keen observer in nature as well as in his own work. The simplest observed fact was of importance in his eyes in case it indicated something further.

Hydrocarbon Recovery

For example, when considering liquids for use in gas meters he soon found that the heavier oils dissolved the illuminating hydrocarbons out of the gas, and that these hydrocarbons could be recovered from the spent oil by volatilising them out and condensing them. He announced his discovery in a paper in 1874 to the West of Scotland Association of Gas Managers. In the course of the discussion he remarked that the naphthalene dissolved out from gas by heavy oils would tend to be retained by them upon re-evaporation.

He afterwards became associated in the Aitken and Young process for condensation in gas manufacture.

His first communication to the North British Association of Gas Managers—'The utilisation of the gases resulting from the destructive distillation of shale in the manufacture of paraffin oil'—was made in 1876. In 1892 he announced a process for the manufacture of permanent gases from heavy oil.

Young's last paper to an Association (the North British) in 1903 was: 'Remarks upon the Principles Involved in the Production of Gases from Coal, and Suggestions as to their Application in Future Developments.' This paper is directed to the possibilities of the management of carbonisation so as to produce much ammonia, and a large volume of gas in which the principal value would lie in the heating power; the tars obtained being used towards such enrichment as might be needful.

In his later life the illuminating power of gas, formerly paramount, was gradually being supplemented by calorific value as a yardstick of quality. He failed by 13 years to reach the age of 80 at which he would have seen the test for illuminating power finally discarded, and the measurement of calorific value substituted, by the Gas Regulation Act, 1920.

Electrical Development

His scientific outlook is apparent from his interest in the illuminating power of flames and the relation between this and the chemical constitution of the gas. His practical knowledge is shown by the way in which he traced the effect of pulsations in the retort, due to bubbling in the hydraulic seal, as a potent factor in the deposition of carbon as graphite in retorts.

There is no doubt that he had a real scientific insight and has been described as an intensely practical man with an intensely scientific mind.

He died on March 1, 1907, in his sixty-seventh year.

If by some magic William Young were alive today what differences would strike him most as he surveyed our country and its fuel industries and compared their present state with that of, say, the 1890s? Remembering that he was a man of restless intellect, always seeking new processes, he would note the tremendous development of the electrical industry, and the world-wide scope of the oil industry, but he would probably be surprised to see that the manufacture of town gas in this country still depends very largely on the carbonisation of coal.

Although he was a keen student of the carbonisation process, he also devised processes for the conversion of oil to town gas, and he would surely have expected that by now chemical engineering principles would have been applied to the gasification of coal, so that town gas, no longer needing to have an illuminating value, could be made from coal without the production of coke.

He would, however, be pleased that the gas industry had grown so much since his day and that gas now provides such efficient domestic and industrial heat services. He would be gratified that his own conception of a heating gas (as opposed to illuminating) was fully accepted.

Young would recognise that the present size of the industry, 12.9 mill. consumers, using 2,550 mill. therms of gas a year supplied through 93,777 miles of main, makes it of importance by any standard. The amount of coal used in 1958-59 by the gas industry was 24¼ mil. tons or about one-ninth of all coal raised in Great Britain. During the past ten years the area gas boards have begun the construction of gas grids where these did not already exist to such good effect that nearly 600 gasworks have been closed down, the gas supply being brought from larger and more efficient works. During the same period the efficiency of operation has been so increased that 2½ mill. tons of coal equivalent is being saved per annum compared to what would have been used had the standards of efficiency prevailing in 1948 remained unaltered. He would be pleased to see that during the ten years sales of gas had increased by 19%, but the negligible part of this increase which has taken place during the past four years would further disappoint him as it disappoints us, and part of this lecture is devoted to a discussion of ways in which the use of gas can be expanded.

It would strike William Young forcibly that there are more elderly people and fewer children in the population. In 1850 the population of England and Wales was 18 mill. and of Scotland nearly 3 mill. In 1950 the corresponding figures were about 44 mill. and just over 5 mill. But these totals hide very big changes in the proportions in the different age groups.

Fall in Death Rate

Young's life fell within a period of rapid growth of the population. This started early in the 18th. century because of a dramatic fall in the death rate due in part to a higher standard of medical knowledge and skill, and in part to an increase in the price of gin following the Act of 1751 whereby spirits were highly taxed. The gin of 250 years ago in the quantities in which it was then drunk is said to have been an important cause of premature death. At about this period many well-known hospitals were founded, and even older hospitals re-vitalised and this must have helped to raise the standard of medical knowledge. With the birth rate continuing high and the death rate continuing to fall the population grew by leaps and bounds from the middle of the 18th. century until the second decade of the present century.

Owing to the decline in the birth rate which took place during the first three decades of this century the proportion of children is much lower than during Young's life. On account of smaller families and fewer deaths, the proportion of people with young families is less and that of middle aged couples whose children have grown up is much higher.

The expectation of life which for a boy born in 1850 was 40 years, for a boy born in 1951 had become 66 years. For a man of 65 the expectation of life was, in 1851, 10.8 years and in 1951 11.7 years. So that a baby boy's expectation of life during this period of 100 years has risen by more than half, that is from 40 to 66 years, but the prospective span for a man of 65 has lengthened by less than a year. The consequence is that many more people are alive among the over 65s as a proportion of the total population.

Because so many more people reach the age of 65, but having reached that age, live little longer than their predecessors 100 years ago, the proportion of total deaths which relates to the age groups over 65 is much higher than previously.

The figures in Table 1 taken from appendix I of the Report of the Committee on the Economic and Financial Problems for the Provision of Old Age, Cmd. 9333, illustrate these points:—

TABLE 1

Population of Great Britain (Men and Women)

Year	Age group 0-14	15-44	45-64	65 and over	All ages
	(a) Numbers (millions)				
1851	7.4	9.5	2.9	1.0	20.8
1901	12.1	17.7	5.5	1.7	37.0
1951	11.0	20.8	11.7	5.3	48.8
1979 (Est.)	10.5	21.0	12.7	8.0	52.2
	(b) Percentage distribution				
1851	35	46	14	5	100
1901	32	48	15	5	100
1951	22	43	24	11	100
1979	20	40	25	15	100

The 1979 figures assume that the mortality rates of the over 65s will continue more or less stable as they have been in recent years. Any appreciable improvement in the treatment of people suffering from malignant diseases and heart troubles could soon bring about a still larger increase in the proportion of older people.

The estimates quoted in the Report for the year 2004, and 2029 are much more tentative but the pattern is very similar to that for 1979.

Two Population Groups

There are in effect two groups in the population: The first contains the wage and salary earners; the teenagers, often with high spending power, living at home; the mothers of families; all with money to spend, a desire for a high and rising standard of living, and, in the case of the mother of a family, if not much surplus cash, the need for lots of cooked food, a warm home and really hot water. The numbers in this group are not changing much. The second includes persons of limited means, especially pensioners, who through age may be loth to change the habits of a lifetime during which a low standard of comfort, including a poor standard of warmth and of hot water supply may have been accepted. The numbers in this group are likely to expand for some years to come.

Fifty years ago old people in the wage-earning part of the population usually had to live with relatives or in institutions. Only the better off could afford staff, and so 'single person' or 'two person' households were rare.

Today old people can and do much more often follow their own desire for independence so that one or two are to be found in many a dwelling living on their own, and the number is likely to increase.

The increase in the number of these small households has, therefore, been much more rapid than the expansion of numbers in the older age groups.

Local authorities before the last war are thought to have provided about 1½% of their total housing in forms especially suitable for elderly people. Today the figure is probably several times higher.

These changes present important social problems in the provision of pensions and of welfare services, but it would not be appropriate to go beyond the effect on the gas industry in this lecture. One unfortunate effect is seen in the increased number of accidental fatalities from town gas poisoning which form part (less than an eighth) of the large number of fatal accidents in the home, most of which are due to falls.

Almost three-quarters of the deaths from gas poisoning occur in the age groups above 60 years and more than half in premises occupied by a single person. Explosions from escapes of gas of the type which cause most of these fatalities—hot-plate burners turned on but not ignited—are very rare because an escape which can cause a lethal concentration in a small kitchen within 40 minutes to an hour and a half will take several times as long to build up an explosive mixture, and with more than one air change an hour may never do so.

Sales Point of View

The aim must be to supply non-toxic gas, but in the meantime the development of the G.C.I. cooker for handicapped persons, which is just coming into commercial production after years of intense laboratory work, will provide a safeguard for those who are handicapped because of old age or for other reasons. All its burners are 'protected', that is to say, if gas passes ignition takes place; if there is no ignition no gas passes.

From the point of view of gas sales the important change in the make-up of the population is the reduction in the proportion comprised within large families with growing children and the increase in the number of households in which only one or two people dwell.

As has been shown, by comparison with 100 years ago families are smaller and there are far more people in the later years of middle age whose two or three children have grown up and left home. In these families the husband is earning as much money as he ever did, and sometimes considerably more. The wife may also be at work. The absolute need for fuel in these smaller households will not be so large for a given standard of living as in the groups with children at home, but the money is there to pay for more comfort if this can be offered in a sufficiently attractive and convenient form. One may expect, looking at the changes in population, that householders in the age groups 20 to 65 will continue to provide a remunerative field for the sale of gas at a competitive price. Those over 65 years of age who are living in small households of one or two individuals and with much reduced incomes because of retirement present certain problems. Here there is a demand for fuel for cooking and for warmth but limited means with which to pay for it. The total consumption per household in this group will not reach that usual in the younger sections of the population. Nevertheless in old age, fuel is not only a necessity but a very great adjunct to comfort. Old people feel the cold, and spend more time at home than younger folk. The way in which gas can best give the complete and labour free heat service which these older people need at a cost which they can afford to pay is a subject for continual study.

Appliances suitable for small households may have to be improved and tariffs under which gas is supplied to them need careful consideration, because the number of households will grow for some 20 years to come.

The industry, of course, cannot prosper by supplying only the domestic consumer, and the commercial and industrial markets will, I believe, expand for reasons which I shall give later.

Area gas boards have no monopoly of fuel supplies: their only unique power is to supply gas through pipes. The gas industry, therefore, must live and prosper in years to come on the merits of gas as a fuel. If the cost of gas is competitive and the standard of service good enough, its flexibility for cooking and its high rates of heat release for water heating with its intrinsic convenience as a source of warmth for the home will ensure that sufficient people use it in their homes to make the supply financially remunerative.

The consequence of gas having no monopoly in the supply of heat for any particular purpose is, however, that not every householder whose home is near a gas main takes a supply.

If the sale of gas per mile of main, an important figure in relation to the capital cost of providing a gas supply, is to be maintained, or increased, sales promotion must follow two lines.

1. To secure as many consumers as possible.
2. To increase the consumption of each consumer as much as possible.

In my address to the Sales and Service Conference in September, 1955, I showed that the consumption of a typical domestic consumer using gas for various purposes, but *not* 'continuous' space heating could, with advantage to the consumer, range from 180 to 470 therms per annum as against the existing average of 109 therms.

'Alter Our Ideas'

As gas provides, by means of the modern efficient convector gas fires and by various appliances designed for whole house heating and for water heating, a service which eliminates the need for any other supply of fuel for heating purposes, we must alter our ideas of securing a revenue of £8 to £10 for say 110 therms from an average consumer who also buys solid fuel and contemplate a revenue of £40 to £60 from typical domestic consumers who will depend solely on gas for heat services. By such expenditures consumers are already finding that they can much improve their standard of comfort.

The consumer finds, moreover, that his increased comfort costs him little more than he spent previously on other fuels.

However, by the nature of things, space heating by gas calls for quite substantial expenditure in the winter and much less in the summer and the cost fits in badly with weekly or monthly wages and salaries. If gas is to become really popular for full space heating some form of monthly or even weekly 'budget' plan is needed whereby consumers can spread their gas bills over the year.

When one considers the benefit to the revenue accounts of area boards which will accrue if, say, 20% of their domestic cosumers go over to 'all gas' within five years and 80% by 2000 A.D., the work which may be needed to introduce a plan for collecting the money by equated monthly instalments seems well worthwhile.

This method is used in some other countries and no doubt is being considered by area gas boards in the United Kingdom.

From the figures of population which I have quoted earlier it seems that large numbers will fall within clearly defined groups of consumers:—

1. The married people with children growing up.
2. The married couple whose children have left home.
3. The elderly living in households of one or two.
4. Single people and young married couples.

For all these groups one may expect, as the years go by, a rising standard of living. This means more motor cars, more domestic appliances and more leisure.

More people will be accustomed to pressing buttons and turning switches on their cars. They will expect a standard of performance in their domestic equipment to match that of the modern car: they will not expect any appreciable variation in efficiency because of weather conditions or fuel quality. They will become less and less willing to handle solid fuel and, perhaps disinclined to carry fuel about in cans. With modern trends in underwear they will expect all of their home to be comfortably warm in winter—not just part of one room.

30 Years Ago . . .

Thirty years ago the fall in consumption of gas per consumer in some districts was accounted for, it was thought, by less time spent at home, more visits to the cinema, the growing habit of eating out, and shortage of cash to pay for fuel due to other demands on income. Today the motor car takes people out, but the television keeps them more at home, except for teenagers who tend to lead a more gregarious social life than their elders.

If the industry is to expand it must keep up-to-date in outlook and must deliver fuel into its customers' homes and factories to give a service better than its rivals and at a competitive cost.

A service which involves no delivery by vehicle or container and requires no ash removal appeals to everyone. A fuel which requires relatively simple apparatus for its use and can offer a rate of heat release in domestic appliances up to 100,000 or more B.t.u. per hour has unique advantages over the only other 'piped' or 'wired' fuel. By the use of modern appliances and the introduction of two-part or other promotional tariffs the cost of gas for many purposes has been kept competitive. In spite of these advantages the share of the nation's demand for heat which is supplied by gas is not increasing appreciably; but there is little doubt that if the cost of gas production were cheaper, and the quality of gas was better—non-toxic and sulphur free—demand would rise more quickly.

It is probable that increased demands for heat, created by a rise in the standard of living may be offset in their effect on total fuel consumption by increased efficiency in the production and utilisation of fuels. The potential market for gas in the domestic field alone, however, is illustrated by the fact that solid fuels supply more than 50% of the present usage, gas only about 13%.

A matter of first importance for success in the domestic market is the quality of the appliances available to the public. In appearance and performance they must equal or excel appliances using competitive fuels. More and more the housewife and her husband are interested in the service given by the appliance and in first cost, rather than in whether it uses gas or another fuel.

The manufacturers of gas appliances have produced many excellent new models in recent years, and they are not standing still. If the gas supply industry is to flourish it must continue to give help and encouragement to the manufacturers of gas using equipment. The work of the Watson House Centre, in raising the standard of performance of gas using equipment will, I am sure, continue to be of the greatest importance.

Improving Performance

It looks as if the demands for catering services in restaurants, clubs, coffee and snack bars and canteens will continue to grow with the growth in the number of cars, and with the tendency of the high spending teenage group to gather together outside the home rather than in it. The commercial load can be expanded by the same means as the domestic: Good apparatus, sound tariffs and good service.

The applications of gas in industry which are becoming more numerous are also becoming more specialised. Research has helped in recent years to improve the performance of gas-fired equipment and has enabled gas to be used for processes for which it was not previously thought entirely suitable. It can now be used on the production line in ways which fit in well with modern ideas of production engineering. It can provide heat at modest temperatures or high as may be needed and gas heated furnaces can be used at temperatures up to 2000°C.

In the industrial market gas has a premium value for some uses in which great flexibility, speed of operation, controlled atmosphere or accurate control are vital. In other fields of use cost is important and the lower the price the larger the business. Fuel usage by industry in 1958, excluding the iron and steel industry, is shown in Table 2.

TABLE 2

Fuel	Mill. tons coal equivalent
Coal	32·4
Coke and other solid fuel	3·7
Town gas	4·3
Coke oven gas	0·1
Creosote Pitch mixture	0·6
Electricity	19·7
Oil (excluding refinery fuel)	8·4
Total	69·2

It can be seen that the extent to which industrial gas sales might be expanded, given appropriate conditions of competitive cost and efficient service, is very great.

In the face of intense competition from oil and liquefied petroleum gases the industry can offer to industry, (1) a fuel of consistent combustion characteristics and high purity; (2) a technical service, based on the knowledge gained from past experience and modern research, which will enable the possibilities of gas as a fuel to be fully developed.

Apart from its gasworks, to which I shall refer later, the main assets of the gas industry in offering a fuel

service to its customers are its distribution mains and its trained and loyal staff, using the word 'staff' in its broad sense to include all those who are employed in providing service to the consumer.

The mains on the whole can be regarded as a sound asset, since even very old pipes are often found in good condition. Where there are weaknesses from corrosion, or from overloading, mains systems can be renewed and pressure re-inforced so that additional sales of gas within the limits of capacity of mains and services incur very small costs of distribution. Here is one key to the future success of the gas industry. Business can be increased without much expenditure on mains and services whereas solid and liquid fuels need, for increased sales, more transport and more storage.

By giving the necessary attention to recruitment and training it is possible to ensure that the efficiency of sales and service organisations, including industrial gas departments, will be maintained.

Consistent Quality

Assuming, therefore, that the industry faces the future well furnished with information about the population which it serves; that the staff are sufficient in numbers, well trained and loyal; that the gas-using equipment offered for sale is up-to-date and efficient and that the industry's own distribution mains are maintained and extended so that they do not limit gas sales by restricting the flow, all that remains to ensure success is for the new gasworks to make gas of consistent quality, high purity and low toxicity at a cost which will enable attractive tariffs to be offered to consumers.

The gas industry was based in William Young's day almost entirely on the carbonisation of coal. The carburetted water gas process was introduced to London in 1890 and was soon in general use as a supplement to coal gas for the well-known reasons that, being of low capital cost and being capable of yielding full output from cold at a few hours notice, it enabled the heavy winter peak loads to be met much more economically than was possible by coal gas. The process also enabled coke production to be regulated so as to conform more or less to local needs.

After a time the idea was conceived that if coal could be carbonised in the upper part of a vertical retort and water gas made in the lower part, great economy would result. The continuous vertical retort, a most efficient plant, shows the development of this conception to the point at which the maximum value is obtained from the volatile matter in the coal as an enricher for blue water gas, but however much water gas is made coke is always made for sale.

Another development has led to systems in which coal is fed into a retort superimposed on a water gas generator in which the coke made is gasified so that much more gas can be made from each ton of coal. The enriching effect of the coal gas on the water gas made reduces the need for oil enrichment. Several types of plant embodying this principle have been developed, for example: The Tully plant, popular in Scotland; the Humphreys and Glasgow plant built at Mill Hill gasworks in 1929 after a series of experiments on an existing carburetted water gas plant at that works, the G.I. plant at Kensal Green put to work in October, 1955; (A. F. Grant and C. H. Lewis, I.G.E. Comm. No. 514), and the plant built to their own design by the Power-Gas Corp., Ltd. at Watford and put to work in 1956 (G.J. **289,** 135, 1957). Although there is some latitude in the choice of coal these processes give the best results if a carefully selected graded coal is used. The yield of gas seems to be about 160 therms per ton with a gross calorific value of about 340 B.t.u. per cu.ft. which can be increased if oil is used for enrichment. If a carbonisation coal is used in these processes the results correspond fairly closely to those which would be obtained if the coal were carbonised in retorts and the coke gasified in a water gas plant.

We have, therefore, as processes based on coal which have been in use for some years:

1. Carbonisation with or without the production of water gas by steaming: This thermally very efficient process yields about 400 lb. of coal gas per ton of coal, say 72 therms plus blue water gas if the coal is carbonised in vertical retorts.
2. Water gas: Made as a rule from coke; enrichment is needed by coal gas, oil or rich gas.
3. Complete gasification: A combination of 1 and 2.

Disadvantages of these processes are:—

The dependence of processes 1 and 2 on a fuel, carbonisation coal, the cost of which has doubled in ten years;

The dependence of the economics of the carbonisation process, yielding say 400 lb. of gas per ton of coal, on the revenue received from about 10 cwt. of coke and 10 to 18 gal. of tar;

The toxic nature of the gas made due to the content of carbon-monoxide.

Production Costs

I shall refer later to the effect of the Clean Air Act, 1956, on the market for coke. It may be that as a consequence of this Act the present falling off in coke sales due to competition from oil in the larger domestic and commercial establishments will be diminished. It is clear, however, that the gas industry must so organise at least part of the production of gas in future years that cheap gas can be made without the concurrent production of coke. The price of carbonisation coal has risen so much that even at present prices of coke, which are not unduly low, the cost of gas production is too high. The industry must, therefore, turn to oil, to imported methane, or to cheap grades of coal as raw materials.

Large finds of natural gas in this country would alter the picture, but so far the gas found has been in relatively unimportant deposits.

It may seem surprising that I mention oil, imported methane and coal in that order. The reason is that town gas can already be made at a reasonably economic price from some of the products of oil refineries, and, perhaps, from imported methane. There is, however, no known method of making town gas as we know it by the gasification of coal without enrichment by oil, oil gases or methane. For the time being projects such as that of the Scottish Gas Board at Westfield, whereby gas made from the poorest type of coal in Lurgi generators will be enriched by hydrocarbons from another source, are the best that can be devised using coal.

It is the object of a very important part of the Gas Council's research programme to remedy this situation

It's a

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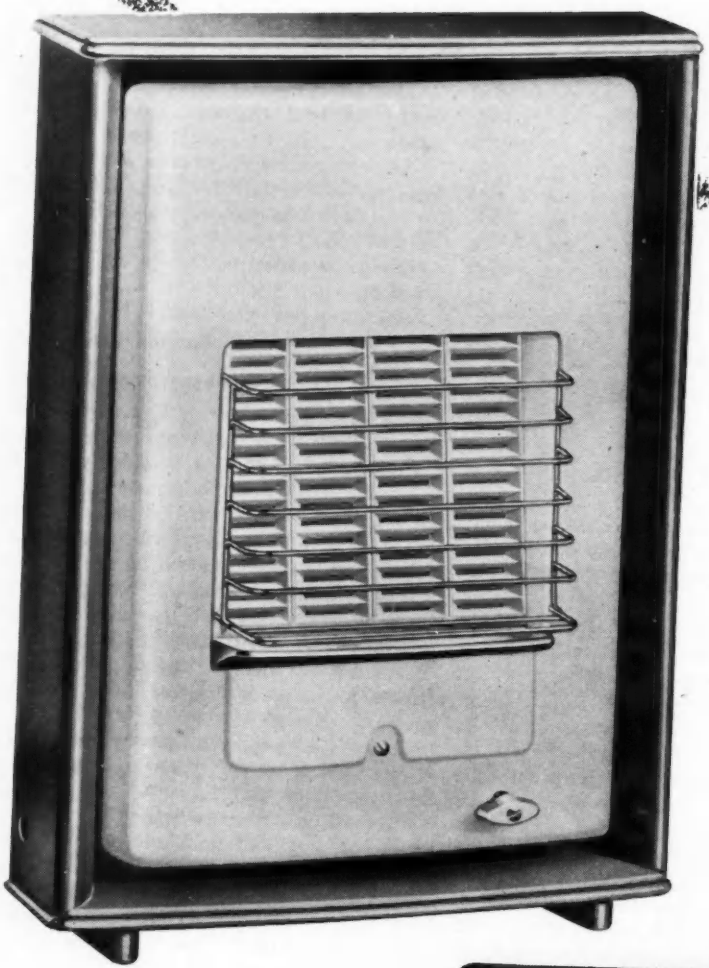

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and by the use of the hydrogenation process to enable an 'all-coal' process for the production of rich gas to be developed.

There are already in use processes for making gas from oil which were not available before the war of 1939-45. I refer to the Onia-Gegi and Segas processes for the catalytic gasification of oil at low pressure. These processes can be used to convert a range of raw materials from methane, through refinery gas, liquefied petroleum gases and primary flash distillate to heavy fuel oil.

This flexibility in the choice of raw material is of great importance in that it enables gasworks based on oil gasification processes to use the feedstock which at any given time will yield the cheapest gas. These processes, however, do not offer all the advantages which it is believed could be achieved by high pressure processes for oil gasification. Benefits hoped for from high pressure are high thermal efficiency, non-toxic gas of low sulphur content, and large output per unit of plant leading to low costs. The delivery of gas at pressure makes pressure processes especially suitable for feeding grid transmission systems.

If coal is to be the raw material it is believed that these processes will offer similar benefits. The Lurgi process for gasifying non-caking coal of small size under pressure is, of course, already available and the Westfield Lurgi plant should be making gas within a year or two.

It is possible to gasify coal by other processes in which steam and oxygen (or air) are supplied continuously or intermittently to the reaction vessel. The gas can be de-toxified and purified to give an acceptable fuel gas. There is, however, as I have already said, no existing method for converting coal into town gas with a calorific value of 475 to 500 B.t.u. without enrichment.

Hydrogenation

Work done at the Gas Council's Midlands Research Station at Solihull shows that in the laboratory oil can be converted to gas by reaction with hydrogen under pressures of say 20 to 40 atmospheres and at suitable temperatures ('Experiments on the Hydrogenation of Oils to Gaseous Hydrocarbons' by F. J. Dent, R. F. Edge, D. Hebden, F. C. Wood and T. A. Yarwood; G.C.37, 1956). It has been found that coal also reacts strongly with hydrogen under somewhat similar conditions to give a high yield of methane ('Investigations with a Small Pressure Gasifier—Part I' by D. Hebden, R. F. Edge and K. W. Foley; G.C.14, 1954). The work on coal and oil is therefore proceeding along parallel lines and discoveries during work on the hydrogenation of oil are helpful in developing the coal-based process, indeed the hydrogenation of oil takes place in a fluidised bed of coke particles the performance of which will be of great assistance in designing a similar installation to hydrogenate coal.

A large pilot plant which, on behalf of the Gas Council, the North Western Gas Board is installing at Partington will include a Texaco gasifier as a source of hydrogen, and a hydrogenation vessel based on the work of Dr. F. J. Dent and his team at Solihull.

The plant should give an output of about 7½ mill. cu.ft. of town gas per day.

In order to avoid the need for a separate source of hydrogen in future installations a pressure reformer is being developed at Solihull. This unit will take some of the rich gas (largely methane) from the hydrogenator and convert it to hydrogen and carbon-monoxide. After the conversion of the carbon-monoxide to hydrogen and carbon-dioxide, the carbon-dioxide will be washed out and substantially pure hydrogen fed to the hydrogenator.

By this system some of the rich gas from the hydrogenator will be used to produce the hydrogen needed for the hydrogenation reaction, so that for a given output of town gas a larger vessel will be needed than if a Texaco or similar gasifier provided the hydrogen. However, no oxygen plant will be needed and it is thought that the reforming process will be cheaper both in capital and running costs.

In addition to these processes for the hydrogenation of coal and oil, which because of the probable capital cost of the plant will be mainly for base load production, a cheaper, catalytic pressure system of gasification has been worked out and is ready for full scale development, using light oils as raw material ('The Hydrogenation of Light Distillate' by L. A. Moignard and K. D. Stewart; G.C.51, 1958).

Thermal Efficiency

These processes will, it is expected, give high thermal efficiencies, but high thermal efficiency is not an end in itself. It is obviously desirable, because if the cost of a raw material is Xd. per therm and the conversion efficiency is Y% the cost of raw material per therm of gas made will be $X/Y \times 100$d. per therm. Thus the higher Y the lower the cost of raw material per therm. Cost of raw material however forms only a part of the cost of gas manufacture, the remainder being mainly the costs of labour, of capital and of maintenance.

It is easy to see that if high thermal efficiency has to be bought with excessive costs for plant construction less costly and less efficient plant may produce cheaper gas.

However, the Gas Council processes are designed to show big thermal efficiency coupled with high output per unit of plant and labour.

They are based on conditions of reaction in pressure vessels not previously experienced on the commercial scale and their success when using coal will only follow a hard, tough, sustained effort during the coming years. The contracting firms who are now licensees for the 'Solihull' processes will, I am sure, be most helpful in the conduct of this difficult task of transforming an idea based on an observation in the laboratory to a full-scale gasworks surpassing anything which the industry has yet seen.

Parallel activities, relating to the gasification of coal only, are the development of a fixed bed Lurgi gasifier at Solihull from which the ash is removed as liquid slag, thus obviating the need for a moving grate inside the vessel, reducing greatly the consumption of steam, and permitting a higher output to be obtained per unit of plant.

An interesting low pressure gasification system which does not need oxygen is being studied by the London Research Station. In this system, known as the Rummel process, coal is to be gasified in a two-shaft vessel according to designs of the Otto company.

It is important that the gas made by these new pro-

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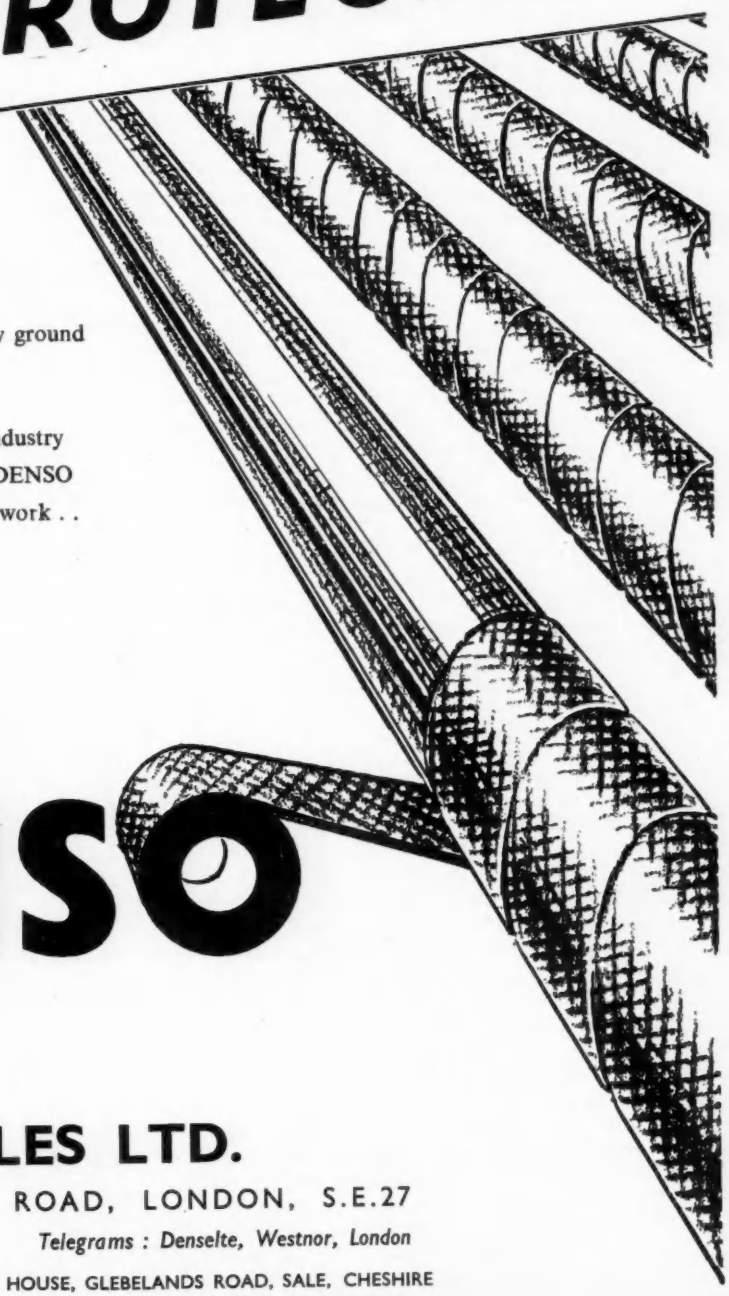

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cesses should be compatible with existing town gas. It is expected to be possible to balance the proportions of rich gas from the hydrogenation process with hydrogen and added nitrogen so as to give satisfactory interchangeability, but in the longer term, if these processes are as successful as is hoped, it may be better to raise the calorific value of the gas supplied and to face the cost of adjusting consumers' apparatus.

Underground Storage

The development of a national gas grid, construction of which may be begun within a very few years, depends on the use of processes which will enable coal or oil products to be gasified at large works, sited where the raw materials are cheapest, to give non-toxic gas, low in sulphur, which can be delivered to Area Gas Boards on such terms that, at any rate for base loads, local production cannot compete.

As peak load manufacture is likely to be very costly for boards if they take much of their base load from the grid, consideration is being given to the possibility of storing gas underground in quantities sufficient to even out the seasonal demand, and also to the possibility of the grid supplying gas at varying rates at different times of the year.

I am very conscious of the shortcomings of this lecture. I have not tried to estimate the quantity of gas which will be sold in 2000 A.D. So many people have been so wrong in recent years in estimating even the total fuel consumption in this and other countries just a few years ahead that I do not flatter myself that I can do better. Nor have I described in detail the new processes of gas manufacture nor forecasted their costs of operation. The technical details have been published already, the costs of operation have yet to be confirmed. However, bringing together the threads which have run through my mind during its preparation, the pattern looks to me like this.

A prosperous poulation, changing in age distribution, will enjoy over the years a rising standard of living.

Piped Fuel Service

This will involve higher levels of comfort which will require higher standards of service from the fuel industries. Gas will play its part. There is likely to be intense competition in fuel supplies and in order to expand its sales in the domestic market and to give good service to industry gas will be made in new types of plant which will feed gas of constant quality and high purity into the grid systems of area boards through a national grid.

These new processes will enable gas to be made from a wide range of raw materials.

When considering the economics of the various alternative methods of gas production in the year 2000 A.D. it is as well to remember that the existing coal price structure does not represent the cost of mining any particular coal, nor does the 'Gulf' price represent the cost of oil production.

By using the products of oil refineries which at any given time are the most economic for gas production, by using imported methane, by gasifying the cheapest type of coal, and by transporting the gas made from the coal fields or harbours in pipes to the consumers' premises, it should be possible to offer gas at prices which will ensure that many consumers prefer a piped fuel service to carrying cans of oil or buckets of coal. The Gas Council has for two or three years been examining the possible construction of a national gas grid with major gasworks to feed it. It is not yet possible to disclose the results of its work, but there is a good prospect that it will show that a gas grid in England supplied with gas made by the existing Lurgi process enriched by oil gases will be economic. If so, when the newer and better processes based on the hydrogenation of coal and oil are available they will be used to feed gas into an existing grid, which can be extended as may be necessary.

Coke Production Reduced

I have, hitherto, not said much about coke or Clean Air. The changes from existing methods of gas production to the new methods must at best take many years. Meantime the gas industry has to live by making gas in existing modern carbonising plants, the coke from which must be sold.

During the last year or so the demand for coke has fallen sharply, old hand-fired coke boilers having been replaced by oil boilers or converted to oil burning.

Coke production has been reduced by the purchase of rather more gas, some increased manufacture of oil gas and carburetted water gas, and consequently the carbonisation of a reduced amount of coal. See Table 3.

TABLE 3

Year	1956/7	1957/8	1958/9
Coal carbonised	27·7	26·0	24·2
Coke made ex retort house	12·6	11·8	10·9
Coke available for sale	11·3	10·2	9·3
Coke sold	10·2	9·6	9·1

Lack of Confidence

Partly because of the smoke control areas created under the terms of the Clean Air Act, 1956, and partly because of a growing public understanding of the dangers of polluted air, there is a growing demand for solid smokeless fuels for use instead of coal in open fires. Unfortunately the public as a whole has not hitherto accepted gas coke as a satisfactory substitute for coal burned in the open fire, although we know that hundreds of thousands of satisfied consumers burn coke in their modern open fires because they prefer it.

The reasons for this lack of confidence in coke are manifold: Coke in the past has not always been of good quality, partly because the coal from which good coke could be made was not available. Public prejudice has been widespread, for example the entirely mistaken belief that coke gives off more 'fumes' than coal. The distributive coal trade has not always encouraged the sale of coke in place of coal.

Some of these matters are under the control of the gas industry itself. Better coal is now available. A British Standard Specification for Open Fire Coke has been drawn up; and I believe that the distributive trade is adopting a more enlightened attitude towards coke.

If coke of good quality is backed up by good service there may for many years be a demand for it. If so,

the gas industry with its heavy investment in carbonising plant is well placed to supply it. If not, the introduction of complete gasification processes must be accelerated. The public will decide this. The Clean Air Act is permissive. Under its provisions local authorities *may* designate smoke control areas, but they do not have to.

By 2000 A.D. . . .

Merchants' disposals of house coal in 1958-59 at 29.254 mill. tons were about the same as in 1955-56 when they were 29.452 mill. tons. In the South of Britain, however, disposals fell from 8.864 mill. tons in 1955-56 to 7.317 mill. tons in 1958-59, an almost exactly equal increase taking place in the North from 20.607 to 22.108 mill. tons. The reduction in the South in three years was thus 17%.

In the long run, by, say 2000 A.D., I believe that the downward trend in the consumption of solid fuel in homes in the South of England will have spread northwards and that with the higher standards of comfort and convenience which I expect to develop gas and electricity will have largely displaced solid and liquid fuels in the smaller home. In the larger house and in commercial premises I foresee that gas and oil will battle for the space heating load, with electricity securing a substantial share.

In short, coke will find a market, largely in the open fire, for years to come, but eventually solid fuel will, in the home, be displaced by more convenient services.

For gas, the future lies largely in our own hands. If we were to try to continue with outworn methods in future years the industry would decline. If we can make best use of all the cheap sources of raw material, available in vast quantities from oil and gasfields overseas, and from the coalfields of this country, the industry will expand. The task is not easy. New gasworks have to be planned and grid pipes laid while the demand for gas is almost stationary.

The Task Ahead

But the area gas boards have already closed nearly 600 gasworks in ten years, laying mains to bring gas from other stations. The task ahead is not really more difficult than in days gone by although it is different. The Scottish Gas Board at Westfield has made a start in the introduction of new processes from which, I am sure, much of value will be learned.

The markets which we serve are large enough for sales of gas to be multiplied several times, but the competition for these markets is so strong that the gas industry could be squeezed to a fraction of its present size.

If steady expansion is to be our aim courage and enterprise must be our guiding lights.

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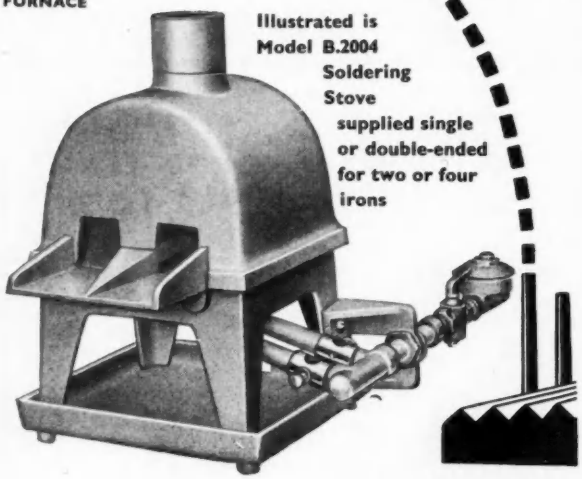

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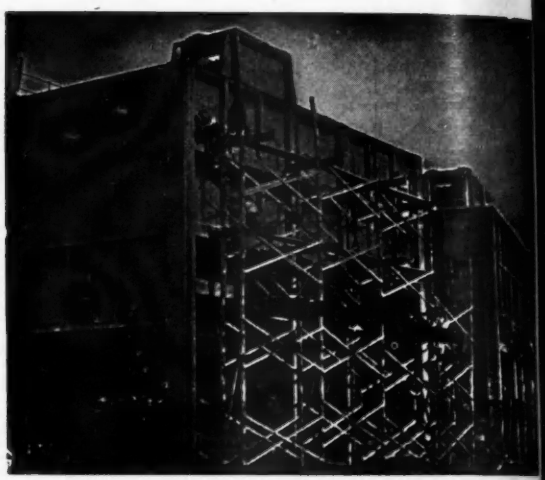

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